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ABSTRACT

Research has shown that stress and anxiety are significant correlates of perceived health, but the effects of job difficulty and job satisfaction are unclear. To study the effect of shift work, job satisfaction, and difficulty and anxiety on reported health, 6,281 electronics technicians, engineers, and support staff completed surveys of demographic variables and subjective ratings of job difficulty, job satisfaction, and health, and a state-trait anxiety inventory. Data analyses showed that while global measures of job satisfaction, job difficulty, and shift schedule did little to increase the prediction of health, some items made a contribution; specific indicators included inability to sleep well, increased daily tiredness, satisfaction with working conditions, and educational level. As expected, age was a prominent indicator. Results also revealed that both state and trait anxiety predicted general health, but did not differentiate whether state of health was due to anxiety or anxiety was due to health. A further study to incorporate both job-related and nonjob-related characteristics and their relationships to trait anxiety is needed. (JAC)

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INTERRELATIONSHIP BETWEEN REPORTED HEALTH, ANXIETY, JOB SATISFACTION, AND SHIFTWORK

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Interrelationship Between Reported Health, Anxiety, Job Satisfaction, and Shiftwork

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Introduction.

A questionnaire was administered to 6,281 electronics technicians, environmental support technicians, engineers, and staff support personnel to study the interactions of several variables in relation to shiftwork, i.e., job satisfaction, job difficulty, health, and anxiety, as well as a number of related demographic variables. Previous studies have indicated that employee reactions to shiftwork is highly complex and depend on the interaction of many variables (Akerstedt, et al., 1977; Kundi, et al., 1979). In analyzing responses to items on the questionnaire, several approaches were taken to place shiftwork in the context of these four areas. This study emphasizes the role of shiftwork within the context of its relationship with job satisfaction, job difficulty, and anxiety in predicting reported health.

A review of the literature revealed that the effects of job difficulty and job satisfaction are somewhat unclear. However, Frankenhaeuser (1977), in a study on the relationship between job demands and health, reported that several over-demanding job

characteristics led to physiological responses that were regarded by Frankenhaeuser as being threats to health and well-being. While Frankenhaeuser's study did not emphasize job difficulty per se, it does indicate that overwhelming job demands could lead to potential health problems. Butler and Burr (1980) found that job satisfaction, placed in context with other variables, may be related to health.

While the literature supports the contention that anxiety and stress are related to reported health, differences in usage of the terms stress and anxiety could be a confusion (see Spielberger, 1972). According to Spielberger (1972), stress is a stimulus and anxiety is a response to stress. However, since the terms stress and anxiety are used somewhat interchangeably in the literature, it is difficult to interpret the overall relationship of stress and/or anxiety and reported health. Nevertheless, Tessler and Mechanic (1978), Kobasa (1979), Beehr and Newman (1978), and House (1979) found in several diverse studies that stress and/or anxiety, was a significant correlate of perceived health.

The present study was designed to investigate the interrelationship of (i) anxiety, (ii) job satisfaction, (iii) job difficulty, and (iv) shiftwork, and specifically, to investigate their effects on reported health, while controlling for the interrelationships of the predictor variables.

Procedure.

Subjects were 6,281 electronics technicians, environmental

support technicians, engineers and staff support personnel who responded to a survey of the total workforce (11,569 employees) of Airway Facilities Services (AFS). Sections of the questionnaire included demographic variables, subjective ratings of job difficulty, job satisfaction, health, and the State-Trait Anxiety Inventory (STAI; Spielberger, in press). The STAI is designed to measure anxiety as a specific state which a person interprets as personally threatening and as a trait which is manifested in a variety of situations (Spielberger, 1972). Demographic variables were age, sex, minority background, education level, advanced training, number of years worked for the agency, number of years in present job position, type of pay schedule (general schedule or wage-grade scale), and pay grade level (indicating approximate salary level).

The overall, or global, measure of job difficulty was the item "In general, how difficult is your job?" with a five-point scale from very difficult to very easy. The global measure for job satisfaction was "How satisfied are you with being employed in AF?" with a five-point scale ranging from very satisfied to very dissatisfied. Self-reported health was measured by the item "How would you describe your general state of health?" Responses were measured on a four-point scale with the alternatives (1) excellent, (2) good, (3) fair, and (4) poor.

To determine the effects of job difficulty, job satisfaction, shift worked, state anxiety, trait anxiety, and demographic variables, on self-reported health and, at the same time, to account for the

interrelationships among the independent predictor variables, two stepwise regression analyses were calculated on the data. In the first, global measures of job satisfaction, job difficulty, anxiety, straight or rotating shift, and demographic variables were regressed on self-reported health. In the second analysis, items covering different aspects subsumed under the global measures were regressed on self-reported health. Global items were not included since they are redundant and would introduce unnecessary multicollinearity into the equation. To assess the ability of the global independent measures to predict specific health problems, another series of stepwise regression analyses were computed using specific physical problems as the criterion variables. Specific physical problems were measured by the respondent indicating current, past, or no treatment of ulcers, high blood pressure, cardiac problems, lung problems, upper respiratory infection, tension or "nerves", stomach problems, or emotional problems.

Results.

Table 1 provides a demographic description of the responding group. Subjects were primarily (83%) in the 30 to 54 year old age range with the largest percentage (26.6%) in the 45 to 49 year old category. Only 7.5% of the respondents were aged 29 and under and 9.5% were 55 and over. Most of the subjects were Caucasian (82.1%) with Hispanics representing the next largest group (7.0%) and Blacks following with 4.9%. Orientals accounted for 2.2% of the respondents, American Indians 1.4%, and "Other" 2.3%. 96% of the respondents were men and 4% were women.

As can be seen under "Degrees" in Table 1, 50.6% of the respondents held a high school diploma. Trade school training was reported by 19.8% of the respondents while 15.3% had attained an associate degree. 12.8% of the subjects had achieved a bachelor's degree with 1.3% holding a master's degree and .2% a doctoral degree.

Pay grade level is an indication of salary level and, generally, of technical or managerial skill. The higher the pay grade level, the higher the salary, rank, and level of skill. During 1980, the year of data collection, a grade level 5 salary was approximately $11,200 and a grade level 13 salary was approximately $29,300. Subjects were primarily in the grade 11 or 12 categories (65.7%) with 19.4% in grade 13 or above and 14.9% below a grade 11.

Table 1 reveals that 28.4% of the respondents had worked for the agency 21 or more years while 48.8% had been with the agency between six and 20 years.

Of the respondents, 10.5% had been in their present position less than one year and 44% between one and five years. 41.5% had been in their present position six to 20 years and 4% 21 years or more.

Tables 2 through 6 are descriptive two-way tables where the global measures of job difficulty, job satisfaction, shift worked, state anxiety, and trait anxiety are distributed across self-reported health. The tables reveal the number and percentages of persons by category of response to global measures and to self-reported health

categories. Chi square tests of significance were not performed as the large sample size would insure non-practical but statistically significant differences.

In Table 2 a consistent pattern exists between job difficulty and reported health for the categories "very difficult", "difficult", and "neither". The largest percentages (48.1%, 54.7%, and 53.0%, respectively) of respondents in these categories report "good" health while the largest percentages (48.4% and 64.2%) of respondents in the "easy" and "very easy" categories report "excellent" health.

As can be seen in Table 3 a pattern also exists between the global measure of job satisfaction and reported health. The percentages of individuals reporting excellent or good health in the two satisfied groups (93.3% and 89.5%) were significantly above the percentages noted for the two dissatisfied groups (80.8% and 73.7%).

Table 4 reveals that more respondents for both straight (51.2%) and rotating shifts (55.4%) reported "good" health with 38.7% of straight shift respondents and 30.0% of rotation shift respondents reporting excellent health. Thus, there was a slightly higher percentage of rotating shiftworkers who reported fair and poor health compared to straight shift workers.

Tables 5 and 6 are very similar in that a strong relationship is shown between health and both state anxiety and trait anxiety. For both tables there is a directional change for reported anxiety in

relation to health. As both state and trait anxiety decreases, health increases.

The first regression analysis, Table 7, where job satisfaction, job difficulty, shiftwork, anxiety, and demographic variables were regressed on self-reported health, yielded a multiple R of .47. Variables deemed to contribute a practical amount of prediction in the equation included trait anxiety, age, and state anxiety. Other variables included in the regression equation were years in present position, job difficulty, type of pay schedule, minority background, shift schedule, pay grade level, years with the agency, degree obtained or special training, and job satisfaction. While there was a statistically significant increase in prediction with these variables, due to the large sample size, the increase was not considered to be of practical significance.

A multiple R of .49 resulted from the second regression equation, Table 8, where items covering sub-elements of the global measures and demographic variables were regressed on self-reported health. The equation included trait anxiety, age, how well one sleeps after day shifts, satisfaction with working conditions, time of day one is most alert, and amount of training attained. When using this procedure several specific questions concerning aspects of job difficulty, job satisfaction, and shift (especially items related to sleep) entered into the equation earlier than when global items of these dimensions were used. This indicates that there is some potential for aspects of perceived job difficulty, job satisfaction, and shiftwork to be

related to subjective reports of general health.

The separate regressions using self-reports of specific health problems as the criterion variables and the global items as predictors yielded the following results: emotional problems (R=.28); cardiac problems (R=.16); stomach problems (R=.25); lung problems (R=.13); respiratory infections (R=.17); and tension (R=.35). While the multiple R was low for all equations, state anxiety or trait anxiety was the first or second variable to enter the equation for all conditions (age was generally the second variable to enter except when cardiac problems was the criterion in which it was, not surprisingly, the first variable to enter the equation). These analyses further indicate the existence of a relationship between both state anxiety and trait anxiety and health.

Discussion.

The results of this study investigating the effects of anxiety, job satisfaction, job difficulty, and shift on general health, show that while global measures of job satisfaction, job difficulty, and shift schedule did little to increase the prediction of health, some items subsumed under the globals make a contribution; specifically the inability to sleep well, increased daily tiredness, satisfaction with working conditions, and educational level. As expected, age was prominent; it was the second variable to enter the equation. The results do reveal that both state and trait anxiety predict general health. The results of the study, however, do not differentiate whether the state of health is due to anxiety or if the anxiety is due

to the general state of health. A further study designed to incorporate both job related and non-job related characteristics and their relationship to trait anxiety is needed. The results of past studies suggest variables that might be productive include intrinsic job stressors, such as objective measures of the job, and extrinsic job stressors, such as family situations (Kasl,1978) as well as selected personality variables such as Type A behavior (Caplan, 1975). However, this study does support the findings of other studies showing that a relationship exists between anxiety and reported health.

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Table 1. Demographic Characteristics of Respondents.

Variabel	Percentage
Age	
24 and under	1.3
25-29	6.2
30-34	10.1
35-39	10.8
40-44	19.7
45-49	26.6
50-54	15.8
55-59	7.0
60 or over	2.5
Minority Background	
Oriental	2.2
Black	4.9
White (Caucasian)	82.1
Hispanic	7.0
American Indian	1.4
Other	2.3
Highest Degree Obtained	
High School	50.6
Trade School-1 yr.	3.8
Trade School-2 yrs.	8.9
Trade School-3 yrs.	7.1
Associate Degree	15.3
Bachelor's Degree	12.8
Master's Degree	1.3
Doctoral Degree	.2
Sex	
Men	96.0
Women	4.0
Pay Schedule	
General Schedule	91.1
Wage Grade	8.8
Pay Grade Level	
Grade 5 or lower	3.1
Grade 6	.3
Grade 7	2.8
Grade 8	1.4
Grade 9	5.9
Grade 10	1.5
Grade 11	25.8
Grade 12	39.9
Grade 13	12.7
Grade 14 or higher	6.7

Variable	Percentage
Pay Grade Level	
Grade 5 or lower	3.1
Grade 6	.3
Grade 7	2.8
Grade 8	1.4
Grade 9	5.9
Grade 10	1.5
Grade 11	25.8
Grade 12	39.9
Grade 13	12.7
Grade 14 or higher	6.7
Years Worked for Agency	
Less than 1 year	2.3
1 year	1.9
2 years	3.3
3 years	3.8
4 years	5.2
5 years	5.9
6 to 10 years	18.7
11 to 20 years	30.1
21 years or more	28.4
Years in Present Position	
Less than 1 year	10.5
1 year	8.8
2 years	10.8
3 years	9.4
4 years	7.5
5 years	7.5
6 to 10 years	25.1
11 to 20 years	16.4
21 years or more	4.0

Table 2. Job Difficulty by Subjective Report of Health Categories (N and Percentages).

	Health				
	Excellent	Good	Fair	Poor	Total
Very Difficult	338 (32.4)	502 (48.1)	166 (15.9)	37 (3.5)	1043
Difficult	982 (33.8)	1588 (54.7)	302 (10.4)	33 (1.1)	2905
Neither	949 (37.6)	1336 (53.0)	213 (8.4)	25 (1.0)	2523
Easy	106 (48.4)	95 (43.4)	17 (7.8)	1 (0.5)	219
Very Easy	34 (64.2)	12 (22.6)	7 (13.2)	0 (0.0)	96

Table 3. Job Satisfaction by Subjective Report of Health Categories (N and Percentages).

	Health				
	Excellent	Good	Fair	Poor	Total
Very Satisfied	751 (45.8)	780 (47.5)	98 (6.0)	12 (0.7)	1641
Satisfied	1108 (32.5)	1942 (57.0)	321 (9.4)	36 (1.1)	3407
Neither	253 (32.4)	387 (49.6)	125 (16.0)	16 (2.0)	781
Dissatisfied	226 (32.1)	343 (48.7)	121 (17.2)	15 (2.1)	705
Very Dissatisfied	78 (34.2)	90 (39.5)	43 (18.9)	17 (7.5)	96

Table 4. Shift Schedules by Subjective Report of Health Categories (N and Percentages).

	Health				
	Excellent	Good	Fair	Poor	Total
Straight Shift	1531 (38.7)	2025 (51.2)	355 (9.0)	43 (1.1)	395
Rotating Shift	681 (30.0)	1259 (55.4)	289 (12.7)	44 (1.9)	2273

Table 5. State Anxiety by Subjective Report of Health Categories (N and Percentages).

	Health				
	Excellent	Good	Fair	Poor	Total
State-Anxiety					
Low	703 (56.5)	501 (40.2)	38 (3.1)	3 (0.2)	1245
Medium	1420 (34.3)	2344 (56.6)	349 (8.4)	27 (0.7)	4140
High	173 (17.2)	506 (50.3)	266 (26.4)	61 (6.1)	1006

Table 6. Trait Anxiety by Subjective Report of Health Categories (N and Percentages).

	Health				
	Excellent	Good	Fair	Poor	Total
Trait-Anxiety					
Low	631 (57.7)	423 (38.7)	38 (3.5)	2 (0.2)	1094
Medium	1540 (36.0)	2372 (55.5)	330 (7.7)	35 (0.8)	4277
High	125 (12.3)	556 (54.5)	285 (27.9)	54 (5.3)	1020

Table 7. Summary Table of Global Items and Demographic Variables Regressed on Health.

R=.47

Variable	Beta Weight
Trait Anxiety	.23606
Age	.14762
State Anxiety	.20999
Years in Position	.04754
Degree or Training	-.04010
Shift	.03362
Minority	-.02335
Pay Grade Level	-.03570
Job Difficulty	-.02175
Years with FAA	.03327
Job satisfaction	.01090
Pay Schedule	.00894
Regression Constant	.4489126

Table 8. Summary Table of Non-Global Items Regressed on Healt

R=.49

Variable	Beta Weight
Trait Anxiety	.24696
Age	.12779
How Well Sleep After Day Shifts	.08845
Satisfaction With Working Conditions	.09227
Morning/Evening Alertness	.11754
Educational Degree Attained	-.06327
State Anxiety	.08868
Get Up/Stay in Bed on Awakening	.05333
Years in Position	.06600
Minority	-.05089
Staying Asleep after Midshifts	.02939
Midshift Productivity vs. Day Shift	-.06477
Satisfaction with Regional Management	.06668
Satisfaction with Present Position	-.04981
Keeping Awake Evenings	.04189
Rating Salary in Relation to Work	.09770
Satisfaction with Salary	-.07052
Ever on Rotating Schedule	-.03305
Work Mentally Straining	.07043
Difficulty of Today's Shift	.03770
Per cent of Time Work is Easy	-.04143
Number of Years on Present Schedule	-.04267
Number of Years of Education	-.03705
Going to Sleep after Midshifts	.02890
Going to Sleep after Day Shifts	-.03195
Rate Stressfulness of Work	-.03577
Staying Asleep after Evening Shifts	.03876
Going to Sleep after Evening Shifts	-.02526
Per cent of Time Work is Difficult	-.02917
Most Efficient Working Time	.02394
Satisfaction with Choice of Occupations	-.02065
Number of Hours Slept after Midshift	-.02060
Number of Hours Like to Sleep	.01179
Number of Years with the Agency	.02413
Rating Typical Workload	-.01697
Satisfaction with Local Management	-.01884
Satisfaction with Supervisor	.01359
Evening Shift Productivity vs. Day Shift	.01480
How Well Sleep After Midshift	.01731
How Well Sleep After Evening Shift	-.01301
Physical Strain of Work	.01180
Pay Grade Level	-.01031
Type of Pay Schedule	.00845
Number of Hours Slept after Day Shift	.00774
Satisfaction with National Management	.00652
Staying Asleep after Day Shift	.00606
Difficulty Keeping Awake Mornings	-.00798
Difficulty Keeping Awake Afternoons	.00615
Total Number of Years on Rotating Shift	.00429
Difficulty Keeping Awake Late Evenings	-.00343
Regression Constant	.3187909